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PATENT
Attorney Docket No. 536-009.014

IN THE SPECIFICATION

On page 1, prior to line 1, please insert the following heading and paragraph:

--CROSS REFERENCE TO RELATED APPLICATIONS

This application is for entry into the U.S. national phase under §371 for International Application No. PCT/EP03/07750 having an international filing date of July 16, 2003, and from which priority is claimed under all applicable sections of Title 35 of the United States Code including, but not limited to, Sections 120, 363 and 365(c), and which in turn claims priority under 35 USC §119 to European Patent Application 02090257.3 filed on July 16, 2002.--

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On page 2, please amend the paragraph beginning at line ~~26~~ as follows:

--During reception, the synchronizer has to peer at the channel in order to detect an incoming packet or frame. Frame detection in a receiver is an especially difficult task because there is no time raster that governs the transmission of the frames. In other words, the receiver does not know when to expect an incoming frame. The object of frame detection is to determine the symbol boundary so that correct samples for a frame can be taken. A major problem in the use of OFDM is therefore the determination of the time instant, at which the receiver starts sampling a new frame. A mismatch in the determination of this parameter would introduce a phase error causing intercarrier interference (ICI).--

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On page 3, please amend the paragraph beginning at line ~~6~~ as follows:

--A method for frame detection in an OFDM signal is described by Chiu et al. (Yun, Chiu, Dejan Markovic, Haiyun Tang, Ning Zhang, OFDM receiver Design, published at URL: http://bwrc.eecs.berkeley.edu/People/ Grad_Students/dejan/ee225c/ofdm.pdf). It uses the first ten short symbols transmitted at the beginning of an OFDM frame, also referred to as the "short ~~traning~~ training sequence". The waveform of the short symbols is known and stored in the receiver ~~deeive~~ device. The receiver performs a correlation of the sampled signal with the stored waveform. It further performs and autocorrelation of the sampled signal with the delay of one short symbol. While the autocorrelation creates a first signal with a plateau over a time

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span during which short symbols are received, the correlation with the known waveform creates a second signal exhibiting peaks. The last peak of the second signal occurring during a plateau in the first signal is chosen as a time reference to start frame detection.--

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On page 4, please delete the paragraph beginning at line ~~7~~ in its entirety as follows:

--~~These objects are solved with a frame detection method according to claim 1, a frame detector according to claim 14, a synchronizing method according to claim 17, and a synchronizer device according to claim 26.~~--

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On page 4, please amend the paragraph beginning at line ~~11~~ as follows:

--According to a first aspect <u>of</u> the invention a method for detection of the reception of a data frame in an input signal ($y_{OFF}(n)$) is provided. The method is based on the fact that the data frame comprises periodically repeated symbols at the beginning. The method of the first aspect of the invention comprises the steps of

a) sampling said input signal ($y_{OFF}(n)$) with a predetermined sampling rate,
b) generating a first signal ($|J(k)|^2$) that is dependent on an autocorrelation of said input signal with a delayed copy of said input signal, [[and]]
c) detecting a plateau in said first signal ($|J(k)|^2$)<u>, and</u>

generating an output signal that is indicative of detecting said plateau.--

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On page 7, please amend the paragraph beginning at line ~~13~~ as follows:

--Detection of a falling slope in the differentiator signal ($J_{diff}(k)$) is preferably performed by a group peak detection method. That means, the differentiator signal is ~~accumulatord~~ <u>accumulated</u> in groups of six samples and the present group is compared with the previous one. If the present group is smaller than the previous one, the falling slope has started. In detail, an accumulation signal is generated that is dependent on the sum of the differentiator signal ($J_{diff}(k)$) over a predetermined accumulation number of consecutive sampling periods. The current accumulation signal is compared with the last previous accumulation signal representing (without overlap) the accumulation number of consecutive earlier sampling periods. If the value of the current accumulation signal is smaller than the value of the earlier

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accumulation signal, a group peak detection signal is generated. In an alternative embodiment, the group peak detection is a binary signal that is for instance "0" if the current accumulation signal is larger, and "1" if the current accumulation signal is smaller than the previous one. The group peak detection signal thus indicates that the differentiator signal is decreasing.--

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On page 8, please amend the paragraph beginning at line ~~8~~ as follows:

--According to a second aspect of the invention, a frame detector is provided for detecting the reception of a data frame in an input signal (y_{OFF} (n)), said data frame comprising periodically repeated symbols at the beginning. The frame detector has

a) a sampling unit adapted to sample said input signal (y_{OFF} (n)) with a predetermined sampling rate,

b) an autocorrelation unit adapted to transform said input signal (y_{OFF} (n)) into a first signal ($|J(k)|^2$) that is dependent on an autocorrelation of said input signal with a delayed copy of said input signal, [[and]]

c) a plateau detector, adapted to detect a plateau in said first signal ($|J(k)|^2$)<u>, and</u>

d) an output unit adapted to generate an output signal that is indicative of detecting said plateau.--

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On page 10, please amend the paragraph beginning at line ~~21~~ as follows:

-- A preferred embodiment of the synchronizing method of the third aspect of the invention therefore further comprises a step of estimating a relative frequency offset (f_ε) in an input signal (y_{OFF}(n)), wherein the estimating step comprises the steps of

a) estimating a coarse frequency offset<u>, and</u> (β)

b) estimating a fine frequency offset (α) in dependence of said estimated coarse frequency offset (β).--

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On page ~~17~~, please amend the paragraph beginning at line ~~29~~ as follows:

-- The autocorrelation block 20 together with the differentiator 52 and the peak detector 54 will constantly peer <u>at</u> the channel. When the peak detector 54 identifies an absolute maximum, the synchronizer will consider that a new frame has arrived and the carrier

frequency offset estimator will be activated. Because of the noise (thermal, digital), the peak detection will not be a trivial task, i.e. a smart peak detection algorithm will be necessary in order to distinguish the absolute from the relative maxima.--

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On page ~~18~~, please amend the paragraph beginning at line ~~28~~ as follows:

--Figure 7 shows a detailed scheme of the several signals involved in the peak detection procedure. A signal FS (dashed line) is given by the group peak detector (falling slope detector). The signal FS is zero until shortly after a peak has ~~occured~~ occurred in the signal $J_{diff}(k)$ (full line),which is shown here again as in Fig. 6. At this point it switches to the value 1. When $J_{diff}(k)$ is detected to increase again, the signal FS switches back to zero. A signal C indicates the value of the counter 72. The counter signal C exhibits an increasing slope after the detection of a peak in the signal $J_{diff}(k)$ until the full range of the counter is reached. After that, the signal C jumps back to zero.--

On page 31, please amend the paragraph beginning at line 23 as follows:

--In summary, the [[the]] proposed synchronizer has the following advantages:--

On page 31, please amend the paragraph beginning at line 28 as follows:

-- A clock [[demain]] domain separation helps to save power in the sense that only certain regions of the system are activated for operation, while others are not, by applying the *clock* gating. Thus, as shown in Figure 17, three clock domains are used here. The blocks belonging to the clock domain #1 peer at the channel trying to detect an incoming frame through the peak detector algorithm. When this is true, the arctangent calculation is triggered, but it will operate only on two samples, thus obtaining two single values for α and β. Afterwards this clock domain is disabled. The combination of α and β to finally obtain ε can be done using combinatorial logic, thus requiring no clock at all.--